

This report was undertaken by Sir Bernhard Samuelson in 1867 at the request of the vice-president of the Committee of Council, and for the purpose of obtaining particulars he visited the principal manufacturing centres of Great Britain and the Continent. The report was published as a Parliamentary paper, and the *Times* records that it was for years referred to in all debates on technical education. He followed up this report by a Parliamentary inquiry into the education of the workmen of our manufactories in 1868, and was chairman of the committee, the report of which was adopted by the House of Commons. He was a member of the Duke of Devonshire's Royal Commission on Scientific Instruction, which issued a valuable report, and also of the Royal Commission on Elementary Education, presided over by Viscount Cross.

Sir Bernhard Samuelson was appointed chairman of the Royal Commission on Technical Instruction, the labours of which extended over the years 1882, 1883, and 1884, and embraced an examination into the systems in use in all parts of the United Kingdom and a great portion of the Continent of Europe. The exhaustive report of the Commission has become the standard authority upon the questions with which it deals. In 1888 he was appointed a member of the Parliamentary Committee for inquiring into the working of the Education Acts.

For his scientific work, Sir Bernhard Samuelson was elected a Fellow of the Royal Society in 1881, and for his many public services he was created a baronet in 1884, and was afterwards made a Privy Councillor. He was a member of the Institutions of Civil and Mechanical Engineers, and was the recipient, in 1871, of the Telford gold medal for a paper on improvements in iron manufactures. He was a member of the council of the Iron and Steel Institute, of which he occupied the presidential chair for two years. At the annual meeting of the institute held last week, the following resolution was unanimously adopted :—“The council have received with the deepest regret the intimation of the death of their esteemed colleague the Right Hon. Sir Bernhard Samuelson, Bart., past-president, P.C., and one of the founders of the institute, and they desire to convey to Lady Samuelson and his family an expression of sincere sympathy in their bereavement. The council feel that it would be difficult to over-rate the services that Sir Bernhard rendered to the Iron and Steel Institute in the promotion of the objects for which it was formed, and they will ever remember with gratitude his constant readiness to devote his time and energies to the advancement of those objects.”

#### DR. OTTO VON STRUVE.

THE announcement of the death of Dr. Otto von Struve does more than awaken a profound regret. His name recalls a period of past history, and summons up before us the memory of times when astronomy occupied a different position from that it assumes today, when it had fewer objects of interest wherewith to attract, and offered fewer problems for solution. Fifty-five years have gone since Otto von Struve received at the hands of the late Astronomer Royal the medal of the Royal Astronomical Society for his paper on precession and solar motion, and sixty-five since the paper was published. Seeing that Struve was born in 1819, he early came into prominence as an astronomer, and the value attached to the results and the confidence inspired by the paper are not a little remarkable, for there were some very obvious objections which might have been taken to the conclusions stated, or at least

it appears so when viewed from a later standpoint. Accompanying the paper was also a discussion of the amount and direction of the solar motion. Only four years had elapsed since Argelander had published his paper assigning with some precision the place of the solar apex, and thus perhaps settling a doubt which had long divided astronomical thought. Prevost and Klugel had taken one side of the question, and Burckhardt and Lindenaу led the party who were unwilling to accept the evidence. Men's minds were certainly divided as to the possibility of detecting the sun's motion, and Struve's paper came at a fortunate moment and strengthened the evidence produced by Argelander, for, based on very different material, Struve's position scarcely differed two degrees from that assigned by the Abo astronomer. Also, Struve was fairly fortunate in fixing the annual amount of the solar motion at about twice that of the radius of the earth's orbit. Later investigations have shown that a greater velocity is probable, but he was certainly correct in asserting that the linear motion of the sun appeared to be less than that of stars in general.

But it was in the domain of double stars that Otto von Struve won his reputation, and it was in this direction that he exhibited untiring industry. His father at Dorpat, and later at Pulkova, had not only devoted himself with great energy to this branch of astronomy, but had introduced a degree of accuracy into the observations that up to his time had been wanting. Otto von Struve, anxious to uphold the family reputation, was as diligent to detect these objects and as accurate in his observations as was his father before him, though he laboured under some peculiar difficulty as an observer, and was obliged to remove a systematic error which affected his observations by introducing a correction depending upon the distance of the component stars—a correction investigated with great care by means of artificial double stars.

From 1861, on the failing health of his father, Otto von Struve became the director of the Imperial Observatory at Pulkova, and in every department maintained the reputation for accuracy the observatory had won. In meridian places of stars, in cometary observations, in geodesy, in spectroscopy, the activity and efficiency of the institution have been everywhere acknowledged. In expeditions, whether for the transit of Venus or for eclipse work, the observatory has displayed its zeal and its desire to cooperate with similar work carried on elsewhere. Instruments have been renewed as needed, and the erection of the 30-inch refractor testifies to the determination to keep the observatory on a level with those best equipped. Under the care of the late director, splendid laboratories have arisen devoted to spectroscopic inquiries, and it is not too much to say that his direction of a world-famous observatory has been of a most enlightened and beneficent character. The recipient of many honours, he retired from the observatory in 1893 to enjoy the repose to which he was so well entitled amid the society of his many friends.

#### NOTES.

THE Croonian lecture of the Royal Society will be delivered by Mr. W. B. Hardy, F.R.S., on Thursday next, May 25, on “The Globulins.”

By the creation of the Committee of Defence, the functions and views of which were described by Mr. Balfour in the House of Commons on Thursday last, an expert advisory body has been introduced into the councils of the Government. In the discussion which followed the speech of the Prime Minister, Mr. Haldane remarked that millions of money uselessly expended would have been saved to the

country if such a committee had existed years ago. The idea underlying the formation of the committee is that for the handling of great national problems the Government must have expert assistance on a scale departmental inquiry cannot supply. Mr. Haldane suggested that it would be to the advantage of the nation if the principle of consultative committees were applied to the scientific organisation of the whole of our executive Government. "We shall never get the best service for the State until we cease to assign it merely to departments, until we can find some body to which it can be assigned that will be working under the head of the State himself. The work of the Committee of Defence illustrates the application of a new principle which will be a very familiar one before the country is much older."

THE Jacksonian prize of the Royal College of Surgeons of England has been presented to Mr. Herbert J. Paterson.

THE Elisha Kent Kane medal of the Geographical Society of Philadelphia has been awarded to Prof. William B. Scott, of Princeton University.

THE seventy-seventh annual meeting of the Society of German Naturalists and Physicians will be held this year at Meran on September 24-30.

THE Prince of Wales, as honorary president of the Royal Statistical Society, has consented to attend the opening meeting of the tenth session of the International Statistical Institute, which is to be held this summer in London.

THE Hanbury gold medal of the Pharmaceutical Society has this year been awarded to Prof. Ernst Schmidt, professor of pharmaceutical chemistry to the University of Marburg. This medal is awarded biennially for high excellence in the prosecution or promotion of original research in the chemistry and natural history of drugs, and Prof. Schmidt is the thirteenth man of science to whom the medal has been awarded. He is the first to receive, with the medal, the sum of £100., which is presented to the medallist by Sir Thomas Hanbury, K.C.V.O.

WE have been requested by the council of the Society of Arts to give publicity to the following resolution passed at a meeting held on May 8:—"In view of the feeling which appears to have been aroused amongst some of the proprietors of the London Institution with regard to the proposed amalgamation with the Society of Arts, and the consequent probable difficulties of effecting a harmonious fusion of the two corporations into a single institution, the council of the Society of Arts have decided not to take any further action in the matter, and hereby discharge the committee which, at the instance of the board of managers of the London Institution, they appointed to consider the scheme for amalgamation."

THE programme has been issued of the optical convention to be held at the Northampton Institute, Clerkenwell, E.C., from May 30 to June 3, under the presidency of Dr. R. T. Glazebrook, F.R.S., director of the National Physical Laboratory. The list of papers to be read and discussed includes many of great scientific interest and practical value. Among the subjects and authors we notice:—the spectroscope in astronomy, Mr. H. F. Newall, F.R.S.; spectroscopic optics, Prof. Schuster; polishing of glass surfaces, Lord Rayleigh; parallel plate micrometer, Prof. Poynting; early history of telephotography, Major-General Waterhouse; tri-colour photography, Mr. A. J. Bull; and some directions of progress in optical glass, Mr. W. Rosenhain. The opening ceremony, presidential

address, and conversazione will be held on Tuesday, May 30. A special lecture will be given by Prof. S. P. Thompson on "The Polarisation of Light by Nicol Prisms and their Modern Equivalents" on Thursday, June 1.

ON May 20 Dr. J. G. Frazer will deliver at the Royal Institution the first of two lectures on "The Evolution of the Kingship in Early Society," and on Thursday, May 25, Prof. J. A. Fleming will deliver the first of three lectures on "Electromagnetic Waves." These are the Tyndall lectures. On Saturday, June 3, Mr. A. H. Savage Landor will begin a course of two lectures on "Exploration in the Philippines." The Friday evening discourse on May 26 will be delivered by Prof. J. W. Brühl on "The Development of Spectrochemistry," on June 2 by Mr. George Henschel on "Personal Recollections of Johannes Brahms," and on June 9 by Sir William H. White on "Submarine Navigation."

THE *Times* announces the death of Lieut.-Colonel L. H. L. Irby at sixty-nine years of age. Throughout his life Colonel Irby took an intense interest in all branches of natural history, ornithology being his favourite subject. In 1875 he published a work on the "Ornithology of the Straits of Gibraltar" (south-west Andalucia and northern Morocco), a second edition of which appeared in 1894; and in 1887 appeared his "Key List of British Birds," which has proved to be of great utility to all lovers of birds. He was for many years a member of the council of the Zoological Society. He assisted in the formation of the life groups at the British Museum (Natural History), and some of the most remarkable of the cases of British birds there bear his name.

THE deaths are announced of M. Fernet, general honorary inspector of public instruction, and Prof. Victor René Muller, of Le Puy, both physicists.

OF the many valuable instruments bequeathed to the French Physical Society by the late M. Félix Worms de Romilly, the most interesting is the telescope bearing on the glass of its mirror the signature of M. Foucault. An account of this historic instrument is given by M. Cotton in the Bulletin of the French Physical Society (No. 226). The mirror has a diameter of 15.2 cm. and a focal length of 68 cm., giving a numerical aperture of about  $f/4.5$ . The resolving power is 200,000, giving an angular separation of 1". This is the only instrument constructed by Foucault with such a large aperture, and it is to be placed in the Paris Observatory after being re-silvered and adjusted by M. Cotton.

A BANQUET in aid of the funds of the London School of Tropical Medicine took place at the Hotel Cecil on May 10. Mr. Chamberlain, who presided, in proposing "The London School of Tropical Medicine," said he could not conceive of any subject of scientific research and philanthropic enterprise which was more interesting than tropical diseases, and it was a duty which we owed to the Empire, a duty which had increased in recent years with the continual extension of our territory. He thought we owed first to Sir Patrick Manson the idea of a tropical school. Almost abreast of him, if not before, came the promoters of the Liverpool School. There was room for all in this work, and they congratulated the Liverpool School on the success it had achieved. There was only one thing he envied them, and that was the liberality and energy of their citizens. He wished that in every other institution they could have a man as energetic, as devoted as Sir Alfred Jones. The London School now had accommodation for 40 students, and since its foundation six years ago 503

students had passed through it. They had to thank Sir John Craggs for founding a scholarship and prize, and Mr. Bomanji Petit, a Parsee gentleman, for a contribution of 7000*l.* The committee now asked for the sum of 100,000*l.* for endowment, which amount was a mere drop in the bucket in comparison with the Liverpool subscriptions. The other speakers were Sir P. Manson, Mr. Alfred Lyttelton, M.P., Lord Strathcona, and the Duke of Marlborough, and among the 400 guests were Lord Rothschild, Sir Douglas Powell, Sir T. Barlow, the Hon. Sydney Holland, Sir Alfred Jones, Prof. Blanchard, Prof. Dunstan, the Hon. John Cockburn, Major Ronald Ross, Sir A. W. Rücker, Mr. Jonathan Hutchinson, Sir W. S. Church, and Mr. Watson Cheyne. Subscriptions and donations to the amount of more than 10,000*l.* were received.

THE visit of the French doctors to London last summer was so successful that a return visit of their British *confrères* to Paris was arranged, and the party arrived on May 10. The proceedings commenced with an evening reception at the Sorbonne. M. Ziard, president of the university council, and Dr. Bouchard, Sir William Broadbent, chairman of the London executive committee, Prof. Clifford Allbutt, of Cambridge, and Dr. George Ogilvie, senior physician to the French Hospital, London, exchanged mutually congratulatory speeches. The extensive and beautiful university buildings were thrown open, and were much admired. On Saturday the visitors attended a reception at the Pasteur Institute. Dr. Roux, the director of the establishment, welcomed the visitors in a short speech, in which he recalled the great services rendered to Pasteur by Lister. In the crypt of the institute, the dean of the medical faculty of the University of London, Dr. J. K. Fowler, laid a wreath upon Pasteur's tomb bearing the following inscription:—"A ce grand Pasteur, le bienfaiteur de la race humaine." In the course of his address Dr. Fowler is reported by the Paris correspondent of the *Times* to have said:—"We desire to offer a tribute of our profound admiration for the great Frenchman whose noble life and example will ever be an inspiration to those who, like him, are devoted to the cause of science. The discoveries of Pasteur alone would suffice to give the nineteenth century a preeminent place in the annals of science. Science knows no frontiers; it unites in a common brotherhood all who devote their lives to its service. Those who humbly follow, no matter at how great a distance, in the footsteps of Pasteur help to unite the peoples of the world. We are convinced that the friendship between France and Great Britain will ever continue to increase in cordiality, and that the two nations will work in accord for the advancement of science and will only strive for the attainment of one noble aim, the peace of the world." On Saturday evening a banquet was held under the presidency of Prof. Bouchard, who, after reading a congratulatory telegram from M. Lobet, announced that he had received from the President of the Republic the mission to bestow upon Sir William Broadbent the insignia of the rank of Commander of the Legion of Honour.

A REUTER telegram from Berlin reports that in the course of excavations in the neighbourhood of Breslau 400 graves and 150 prehistoric dwelling places were brought to light. The oldest of the graves contained bones dating from a period previous to the Bronze age, and in another grave near by were found urns showing that they had contained bodies interred five centuries later. The excavators have been able to trace the site of a village

of the Bronze age. About a dozen huts are clearly recognisable. A whole collection of spinning and weaving appliances has also been dug up.

PROF. F. A. FOREL, writing from Morges, directs our attention to an earthquake which occurred on April 29 last. The centre of the seismic disturbance appears to have been in the neighbourhood of Martigny, Argentiére, and Chamonix, and its intensity at the centre was viii. on the Rossi-Forel scale. The time of the principal shock was April 29, 1h. 45m. Greenwich time. The seismic area was of 250 kilometres radius, and included 200,000 square kilometres, comprising Valais, western, central, and eastern Switzerland, upper Italy, and western France. Further shocks were experienced at Martigny and Chamonix on May 1 at 19h. 22m. and 21h. 53m.; on May 2 the movements were very slight, and on May 6 a shock occurred at 4h. 45m.

REUTER'S Agency is informed that Mr. W. Champ, the leader of the expedition which is being dispatched to Franz Josef Land to rescue the twenty-six American explorers who have been in the Arctic for the past two winters with their ship, the *America*, left England on Saturday for Bergen. He was accompanied to Norway by Dr. Oliver L. Fassig, who has been dispatched by the United States Weather Bureau and the National Geographic Society of Washington to be their representative on the second relief ship, which will be dispatched from Norway to the east coast of Greenland. The main relief expedition, of which Mr. Champ is in command, will leave Tromsö in about a fortnight on board the *Terra Nova*, and will make straight for Cape Flora, Franz Josef Land, where it is expected that records will be found, and probably also some of the explorers who, under Mr. Fiala, the leader of the expedition, have been cut off from all communication with the outside world since July, 1903.

MESSRS. FRIEDLÄNDER AND SON, of Berlin, have sent us a copy of a catalogue of books and pamphlets dealing with the anatomy and physiology of invertebrates.

To the April issue of our Scandinavian namesake, *Naturen*, Dr. H. Magnus contributes the final instalment of his account of South Polar expeditions.

THE birds of the Isle of Pines (about 60 miles south of Cuba), by Messrs. Bangs and Zappey, and the fifth instalment of Dr. B. M. Davis's studies on the plant-cell, constitute the contents of the April number of the *American Naturalist*.

No. 3 of the "Cold Spring Harbour Monographs," by Miss Smallwood, is devoted to the Salt-Marsh amphipod *Orchestia palustris*, a species showing more decidedly terrestrial habits than its immediate relatives, and therefore, presumably, a more specialised type.

THE two plates issued in No. 3 of vol. xxv. of *Notes from the Leyden Museum* illustrate papers on molluscs. In the first of these Mr. M. M. Schepman describes a new species of *Trochus* from the Indian Ocean, and the adult condition of *Bathyembix aeola*, a Japanese form originally described from an immature specimen collected during the voyage of the *Challenger*. In the second Dr. H. F. Nierstrasz reviews the collection of chitons in the Leyden Museum, describing new species.

THE hereditary relations of plants to the diurnal and seasonal periods of their environment form the subject of an instructive article by Dr. R. Semon in *Biologisches Centralblatt* of April 15. In the same issue Dr. Wasmann

continues the account of his researches into the development of slavery among ants. It is interesting to note that the various local races of the widely distributed *Polyergus rufescens* respectively possess different types of slave-ants, which are for the most part subspecies of *Formica fusca*, although in one case the enslaved species is *F. nitidiventris*.

IN connection with the latter part of the preceding paragraph, it may be mentioned that the April number of *Himmel und Erde* (Berlin) contains an illustrated popular account of the "flower-gardens" made by ants in the crowns of trees in Amazonia and Peru, as discovered and described by Mr. E. Ule. These "gardens," or perhaps we might rather say "baskets," are shown in various stages of growth, from the time when the plants are just budding until the long slender leaves of *Streptocalyx angustifolius*, which appears to be the favourite species, are fully developed. All the plants cultivated appear to have very minute seeds, or spores, which seem to be sown by the ants in their nests.

MR. L. M. LAMBE has sent us a copy of a paper by himself from the *Ottawa Naturalist* (vol. xix., part i.) on a large new species of sponge of the genus *Esperella* from the Pacific coast of Canada. We have also received a pamphlet on the life-history of the pear-midge (*Diplosis pyriavora*), by Mr. W. E. Collinge, published by Cornish Brothers, Ltd., Birmingham, as No. 2 of "Reports on Economic Zoology." It contains good figures of the various stages of the development of this pernicious insect, showing the manner in which it destroys young pears.

AMONG other articles in *Naturwissenschaftliche Wochenschrift* for April 30 is one by Dr. J. Meisenheimer summarising the results of recent investigations with regard to the origin and formation of pearls. Several illustrations indicate the positions in which pearls are usually found in shell-fish, while others show their internal structure, and others, again, the parasites usually constituting the nucleus. The researches of Mr. H. L. Jameson and of Messrs. Herdman and Hornell form the basis of a large portion of the paper.

IT has been repeatedly noticed that when a pair of rooks attempt to build apart from the rest in a tree previously unoccupied, the other members of the colony not unfrequently set to work to destroy the nest. An event of this nature is recorded in the *Craven Herald* of April 28 as having taken place in the churchyard of Christ Church, Skipton. In this instance a pair of rooks had built in a tree overhanging Cross Street, and the female was incubating her eggs. While thus engaged she was attacked by the other rooks, who pecked her to death, throwing the body, together with the broken eggs and the ruined nest, to the ground. The attack was witnessed by many persons.

ACCORDING to Mr. E. E. Green, in the March number of *Spolia Zeylanica*, the elephant-mosquito (*Toxorhynchites immisericors*) differs from *Anopheles* and many other members of the gnat family in that the larva is carnivorous. This carnivorous habit was suggested by the structure of the head of the larva, and observation showed that these larvae prey upon one another as well as upon those of other gnats. In fact, but a single survivor was eventually left when a number of larvae were placed in the same receptacle. In a second article Mr. A. J. Chalmers records the species of *Anophelinae* found in Ceylon, while in a third Mr. H. Schouteden contributes notes on

Ceylonese aphides, with descriptions of new forms. Considerable interest attaches to a note by J. Hagenbeck in the same issue on an incubating python which safely brought off a number of young snakes.

IN the *Zeitschrift für wissenschaftliche Zoologie*, vol. lxxix., part i., Mr. O. Schroeder, of Heidelberg, discusses the abdominal sense-organ, or so-called abdominal eye, of the palolo worm (*Eunice viridis*) of Samoa. This organ differs so widely from all definitely known types of eyes that it is difficult to find a basis of comparison. Indeed, whether it is an organ for the perception of light at all is extremely doubtful. The reasons that it has been regarded as such are the presence of nerve-cells, pigment, and a lens; but similar pigment is found in other parts of the creature's body, while the so-called lens would not come under the optician's definition of such an instrument. Pigment and lens-like structures are not unfrequently met with in luminous organs, but the so-called eye of the palolo worm certainly does not come under this category. In no other annelid has a similar organ been detected. The other articles in the same issue include one by Mr. P. Heinemann on the development of the mesoderm and the structure of the tail in the ascidian larva; a second, by Dr. M. Lass, on the histological anatomy of the female dog-flea; and a third, by Mr. A. Rufini, on the existence of an undescribed sheath in the terminal tract of human sensor nerves.

PROF. W. B. BENHAM, writing from the Otago University Museum, Dunedin, comments upon Dr. Alex. Hill's letter in our issue of February 2 on "Can Birds Smell?" Prof. Benham says that several points concerning the structure and habits of the kiwi suggest that its sense of smell is possibly highly developed. The nostrils, instead of being at the base of the beak, are at the extreme tip and on the under surface. The olfactory sacs, with their complex of turbinals, extend so far back as to project into the orbits, the eyes being separated by them instead of by a thin bony interorbital septum. The eyes of the bird are small and inefficient, notwithstanding its nocturnal habits, and observers state that the kiwi seeks its food by its sense of smell or hearing. In searching for food, the bird thrusts its beak into moss, piles of leaves, or into holes in the ground, and assumes an attitude suggestive of trying to obtain evidence of the presence of food either by smell or by listening for the sound of movements made by a worm in its burrow. These statements suggest the probability of a well developed sense of smell by the kiwi, and Prof. Benham hopes to have experiments carried out on the apteryx, oxydromus, and stringops in order to obtain evidence upon the matter.

THE *Century Magazine* for May contains articles by Mr. Brush on the evolution of the arc electric light, by Mr. Holland on the recently discovered white bear of north-western British Columbia, and by Dr. McGee on the Japanese Army medical service. In the last named the organisation is described, particularly the arrangements in force for treating and transporting the large number of wounded from the seat of war, and the sanitary arrangements whereby typhoid and dysentery, the great scourges of armies in the field, are hardly known.

THE April number of the *Bulletin of the Trinidad Botanical Department* contains articles on the phosphoric acid requirement of cacao plants, and on coffee curing for the small settler. The record of the visits paid by the two agricultural instructors to different districts and schools shows that their services are highly appreciated throughout the island.

THE fact is not generally known that species of the cycad *Zamia* can be artificially multiplied by cuttings. The subject of regeneration in *Zamia* is treated by Dr. J. M. Coulter and Mr. M. A. Chrysler in the *Botanical Gazette* (December, 1904). As a rule, new growth proceeds from meristematic tissue of the cork, but an instance is mentioned in which a portion consisting only of cortex gave rise to new shoots and root.

THE Department of Agriculture at Nairobi has instituted a series of leaflets which should be most useful to settlers in British East Africa. The first, issued in January, gives the native names in different dialects for the principal crops. A second provides some useful hints for cotton cultivators. Egyptian seed is recommended in preference to Sea Island or upland American, because, so far as experience goes, it has produced heavier crops, and also because it has been less affected by unfavourable conditions of the weather.

WE have received vol. xxvii. of *Aus dem Archiv der deutschen Seewarte*, for the year 1904. This valuable work, like its predecessors, contains some important discussions of meteorological and kindred subjects by well known men of science. One by Dr. W. J. van Bebber, entitled "Barometer and Weather," is of especial interest to meteorologists. He discusses, with reference to Hamburg more particularly, the relations of barometrical conditions to rainfall, temperature, and weather generally for the year, seasons, and months, for a period of twenty-five years. On this subject he brings to bear the special knowledge obtained as chief for many years of the Hamburg weather forecast department.

THE Meteorological Office has issued a circular stating that it will, as before, supply forecasts of weather by telegraph to agriculturists during the coming harvest season, at the cost of telegraphy only. These forecasts are prepared each afternoon from June 1 to September 30, except Sundays; but in view of the suspension of agricultural work on that day the office will, if required, transmit special forecasts on Saturday evening, giving, in very general terms, the prospects of the weather for the ensuing forty-eight hours. In the last published annual report of the office it is stated that many of the recipients of these forecasts keep a record of the weather experienced during the time the forecasts are sent, and return them to the office for the purpose of checking the results. From this comparison it appears that about 50 per cent. of the telegrams were completely successful.

MESSRS. CARL ZEISS, of Jena, have issued a new catalogue (in English) of their photomicrographic outfit for use with ultra-violet light of wave-length  $0.275 \mu$ , in addition to several catalogues of new ordinary microscope stands. The whole of the glasses—eye-piece, objective, slips and cover glasses—are of fused quartz, and the source of light is supplied by the current of sparks of a Leyden jar between cadmium electrodes. We notice one correction—dissolving power should be resolving power.

AMSLER'S planimeter is so well known to mathematicians that there is no need to direct their attention to its usefulness. We have, however, just received a small pamphlet by Mr. William Codd (London: E. and F. N. Spon) entitled "Land Area Computation made Easy," the object of which is to show non-mathematical readers how simple is the process of computing areas from maps or plans with this instrument. Mr. Codd has also, we learn, published "land area tables" to facilitate reduction to acres, roods, and perches, thereby saving the tedious calculations which are unnecessary in countries using the metric system.

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A SERIES of observations on respiration at high altitudes is described by Prof. Angelo Mosso in the *Atti dei Lincei*, xiv. (1) 6. A special feature of these observations is the effect of carbon dioxide as a remedy for mountain sickness, a property regarding which experiments performed both on human subjects and on monkeys have led to most conclusive results in Prof. Mosso's hands. It is recommended that about 8 per cent. of carbon dioxide should be added to the compressed oxygen carried for use in high balloon ascents, as pure oxygen is not in itself sufficient to remedy the effects of great barometric depressions.

IN the *Transactions of the Institution of Engineers and Shipbuilders in Scotland* (xviii., 5), Mr. John Riekie discusses the various systems of compound locomotive engines, and describes a new form with which he has experimented. In it there are two equal high-pressure cylinders and one low-pressure cylinder of about  $1\frac{1}{2}$  times the volume of the combined pair. It appears to differ from the well known "Webb" compound in that the crank-rods are all connected to a single three-throw crank set at angles of  $120^\circ$ , instead of working on the cranks of the axles of the two different driving pairs. It requires no special starting gear.

THE *Atti* of the Lincei Academy (xiv., 4) contains the announcement of the foundation by the King of Italy of a new international institution of agricultural studies. Among the advantages likely to accrue from the establishment of such an institution, the advancement of our knowledge of the best methods of combating against plant-diseases is specially mentioned. On this latter branch of study an interesting paper occurs in the same number of the *Atti*, by Dr. Vittorio Peglion, on the pathology of *Euonymus japonica*. This shrub, so common in Italian gardens, has been for many years subject to diseases, traceable in the first place to a scale insect, and in the second to a species of Oidium described by Saccardo and Arcangeli under the name of *Oidium evonymi-japonicae*, with which the present paper deals.

FROM a copy of the *Corriere di Catania* received from the Observatory of Catania, we gather some interesting particulars of the sudden eruption of Stromboli which took place about four weeks ago. On April 16, at about 2.9 p.m., a tremendous explosion as of a big cannon was heard, and the whole of the eruptive portion was enveloped in a dense black smoke. A large number of masses about one metre in diameter, and other smaller ones, were projected to a distance of 200 metres, and rolled down the Sciara del Fuoco to the sea, raising clouds of dust in their descent. Four or five minutes later there was a fall of scoriae, about 5 cm. in diameter, over an area 4 kilometres long and 400 metres broad running E.N.E. of the volcano, in which direction the wind was blowing. A shower of ashes followed, and a quarter of an hour later a slight shower of rain occurred. At the time of the eruption Dr. Schulze was 300 metres to the south of the eruptive cone, where he was wounded in the head and leg by falling stones, fortunately not seriously. According to him, the opening by which this explosion took place is in the centre of the six others; it is known as No. 4. A considerable panic occurred throughout the island, and many of the inhabitants declare that such an eruption has never been witnessed before.

IN the Journal of the Russian Physical and Chemical Society (1904, No. 4) we notice the following papers:—An elaborate sketch and scientific analysis of the work, in organic chemistry, of Prof. Egor Egorovitch Wagner, by

V. V. Lavroff, followed by a full bibliographical index.—Determination of the inner energy of the gas-liquid systems, by A. N. Tschoukareff, with a *résumé* in French. By sealing various liquids in steel "sparklets," capable of supporting considerable inner pressures, the author could thus bring these liquids to high temperatures, above the critical temperature, and thus determine the specific heat of these substances in the critical state.—On the theory of the singing Voltaic arc, a mathematical inquiry by S. Maysel, which brings the author to conclusions opposed to those of Duddell, Janet, and Granqvist.

MESSRS. MACMILLAN AND BOWES, Cambridge, will publish in a few days a small book on "Mendelism," by Mr. R. C. Punnett, Cambridge. The volume will give an outline of Mendel's work on heredity, and its recent developments.

IN the notice of Dr. D. Murray's volumes on "Museums" in our issue of April 13 (p. 554), the reviewer referred to the list of museums in the United Kingdom given in the work as being based on one prepared by the Museums Association. Mr. E. Howarth writes to point out that the list was a reprint of one prepared by a committee of the British Association in 1887, and not by the Museums Association, which did not commence the preparation of a museums directory until 1902.

MESSRS. GEORGE BELL AND SONS have published the second part of the key to the "Elementary Algebra" of Messrs. W. M. Baker and A. A. Bourne.

#### OUR ASTRONOMICAL COLUMN.

ORBIT OF COMET 1905 a.—A graphical representation of the orbit of comet 1905 a, according to the elements computed by Miss Lamson, of the U.S. Naval Observatory, is given in No. 5, vol. xiii., of *Popular Astronomy*. From this it is seen that the comet, at its perihelion, passed within 12,000,000 miles of the earth, but the latter body had, about a month before, passed the point where closest proximity was possible. The comet will continue, therefore, to grow fainter, and on May 30, according to Miss Lamson's ephemeris, it will be only 0.3 as bright as when first discovered, and it was only a faint telescopic object then.

PROVISIONAL ELEMENTS FOR JUPITER'S SIXTH SATELLITE.—Whilst awaiting more definite information from Lick, Mr. Crommelin has computed provisional elements for Jupiter's sixth satellite from the data already available. These data are not sufficient to decide the eccentricity of the orbit, so a circular form has been assumed. Although the Lick observers have now stated definitely that the "retrograde" in their first telegram did not refer to the orbital motion, the observations yet made have not settled the question of direction, and Mr. Crommelin has therefore computed elements both for "direct" and "retrograde." He finds the distance from the parent planet to be about 6,200,000 miles, and a comparison of this with the observational data favours a "direct" orbital motion, although, of course, much uncertainty exists. The inclination of the satellite's to the planet's orbit is 23°.8 or 23°.9, according to whether the motion is "direct" or "retrograde," whilst the inclination of the orbit to Jupiter's equator is either 26° or 24°.7. This inclination is unusually large as compared with other satellite orbits in the solar system, and according to the reports so far received the orbit of the seventh satellite has a still larger inclination.

According to the "direct" hypothesis, the pole of the sixth satellite's orbit is only about 1°.5 from our own North Pole, so that the major axis will always point nearly due east and west. A determination of the position angle next July, when it again reaches western elongation, should decide the question of the satellite's motion. The semi-minor axis of the apparent ellipse on December 25 (W.

elongation) was 4°.96, and from this it is deduced that the inclination of the orbit plane to the line of sight on that date was 5°.7 (*Monthly Notices*, vol. lxv., No. 5).

WINTER FIREBALLS IN 1905.—In No. 357 of the *Observatory* Mr. Denning summarises the accounts of fireball observations, during January and February, which have been forwarded to him. Quite an unusually large number of these objects were observed. One slow meteor seen on January 27 at 11h. 59m., and another seen on February 28d. 12h. 10m., were at least as bright as the full moon, whilst one on January 14 at 10h. 16m., which was brighter than Venus, was noted by one observer as being followed by a slight rumbling noise at an interval of  $2\frac{1}{2}$  minutes. The probable radiant of this object was  $110^{\circ} + 3^{\circ}$ , and it travelled from a height of 60 miles to a height of 29 miles, along a path of about 55 miles, with a velocity of 15 miles per second. A meteor seen at 10h. 15m. on February 28 from a radiant at  $220^{\circ} + 40^{\circ}$  divided into two parts at disappearance, whilst the last named of the eighteen objects mentioned in Mr. Denning's report, seen at 9h. 10m. on March 18, swelled out and exploded three times with lightning-like flashes during its four seconds' flight.

OBSERVATIONS AND LIGHT-CURVES OF SEVERAL VARIABLE STARS.—In No. 4011 of the *Astronomische Nachrichten* Dr. L. Terkán, of the O-Gyalla Observatory, publishes the results of a series of observations, and some light-curves, of several important variable stars. The observations were made during 1904 with a Zollner photometer, and the results are compared with the various published elements of each object. The stars dealt with are S Sagittæ, T Vulpeculae, δ Cephei, η Aquilæ, β Persei, and λ Tauri.

OBSERVATIONS OF "D<sub>3</sub>" IN THE SOLAR SPECTRUM.—In No. 4012 of the *Astronomische Nachrichten* Dr. H. Kreusler, of Berlin, records two observations in which he saw the helium line, D<sub>3</sub>, as a dark line in the spectrum of the region about a sun-spot. The first observation was made between noon and 2 p.m. on June 12, 1904, the second on the following day, and on both days the faculae surrounding the spot were exceptionally bright. Dr. Kreusler suggests that, as it was near a maximum epoch of solar activity when Prof. Young recorded a similar observation in 1870, this phenomenon may be a characteristic of sun-spot maxima.

BRIGHTNESS OF JUPITER'S SATELLITES.—In an attempt to settle the question of the variability of Jupiter's four brightest satellites, Prof. Wendell, of Harvard, made a series of photometric comparisons of them with a polarising photometer attached to the 15-inch telescope. The satellites were compared, for brightness, among themselves, and a large number of "settings" was made in such a manner as to eliminate accidental errors. The order of brightness was always iii., i., ii., iv., and the results afford no evidence for any variability during the period over which the observations extended, viz. from J.D. 2416900 to J.D. 2416928 (Circular No. 95 of the Harvard College Observatory).

VARIABLE STARS IN THE SMALL MAGELLANIC CLOUD.—Some time ago it was reported in these columns that Miss Leavitt had newly discovered 57 variable stars in the small Magellanic cloud. In order to provide material for a closer study of the light-curves of these objects, sixteen negatives were taken at Arequipa with the 24-inch Bruce telescope, with exposures varying from two to four hours each. When the plates arrived at Cambridge (U.S.A.) in January, Miss Leavitt was greatly surprised to find that in this same region there were hundreds of variables which had not been seen on the previous inferior plates. In Circular No. 96 of the Harvard College Observatory the number in each half-degree square of the region is given, and, including the 57 previously announced, there are 910 new variable stars in all. This means that within the limits of the clouds there is one variable to every 308 stars, whereas of the 40,000 stars in the surrounding region shown on the plates only one in 3300 is apparently a variable, although all have been examined with equal care.

During the examination of the plates it was found that a thirteenth magnitude star, the position of which for 1900.0 was R.A.=rh. 6m. 1s., dec. =  $-72^{\circ} 45' .5$ , has a large proper motion amounting to  $+0.13s.$  in R.A.,  $+0.42$  in dec., and  $0.73$  in a great circle.